

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Correct the vendor part number from AD8039SARZ-EPR7 to AD8039SRZ-EPR7. - ro	17-10-18	C. SAFFLE
B	Add typical limits to BW, SR, V _{IO} , I _B , CMRR, I _Q , and PSRR parameters as specified in Table I. Update document paragraph to current requirements. - ro	24-01-17	J. ESCHMEYER



Prepared in accordance with ASME Y14.24

Vendor Item Drawing

Revision Status of Sheets

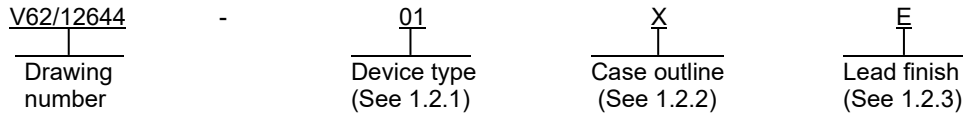
REV																			
SHEET																			
REV	B	B	B	B	B	B	B	B	B	B	B	B	B						
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13						

PMIC N/A Original date of drawing YY-MM-DD 12-11-29	PREPARED BY RICK OFFICER			DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990 https://www.dla.mil/landandmaritime					
	CHECKED BY RAJESH PITHADIA			TITLE MICROCIRCUIT, LINEAR, LOW POWER, 350 MHz VOLTAGE FEEDBACK AMPLIFIER, MONOLITHIC SILICON					
	APPROVED BY CHARLES F. SAFFLE								
	SIZE A	CAGE CODE 16236		DWG NO. V62/12644					
REV			B	PAGE 1 OF 13					

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance low power, 350 MHz voltage feedback amplifier microcircuit, with an operating temperature range of -55°C to +105°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:



1.2.1 Device type.

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	AD8039	Low power, 350 MHz voltage feedback amplifier

1.2.2 Case outline. The case outline are as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	MS-012-AA	Plastic small outline

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

<u>Finish designator</u>	<u>Material</u>
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
F	Tin-lead alloy (BGA/CGA)
Z	Other

1.3 Absolute maximum ratings. 1/

Supply voltage (VS)	12.6 V
Power dissipation (PD)	360 mW 2/
Common mode input voltage (VIN)	±VS
Differential input voltage	±4 V
Storage temperature range (TSTG)	-65°C to +125°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature range (TJ)	150°C

1/ Stresses beyond those listed under "absolute maximum rating" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

2/ Power dissipation arrived by $PD = (T_J - T_A) / \theta_{JA}$. $PD = (150 - 105) / 125 = 0.36$ W.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 2

1.4 Recommended operating conditions. 3/

Supply voltage range (VS) ±5 V
Operating free-air temperature range (TA) -55°C to +105°C

1.5 Thermal characteristics.

Thermal resistance, junction to ambient (θJA) 125°C/W

2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at <https://www.jedec.org>.)

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer’s part number as shown in 6.3 herein and as follows:

- A. Manufacturer’s name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer’s part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user’s risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 3

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions VS = ±5 V, RL = 2 kΩ, gain = +1 unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Dynamic performance.							
-3 dB bandwidth	BW	G = +1, VOUT = 0.5 Vpp	-55°C to +105°C	01	300		MHz
					350 typical		
		G = +2, VOUT = 0.5 Vpp	+25°C		175 typical		
					100 typical		
Bandwidth for 0.1 dB flatness	BW	G = +2, VOUT = 0.2 Vpp	+25°C	01	45 typical		MHz
Slew rate	SR	G = +1, VOUT = 2 V step, RL = 2 kΩ	+25°C	01	400		V/μs
			425 typical				
			-55°C to +105°C		300		
					325 typical		
Overdrive recovery time	tODR	G = +2, 1 V overdrive	+25°C	01	50 typical		ns
Settling time to 0.1%	tS	G = +2, VOUT = 2 V step	+25°C	01	18 typical		ns
Noise/harmonic performance.							
Signal frequency distortion response (SFDR)							
Second harmonic	HD2	fc = 1 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-90 typical		dBc
Third harmonic	HD3	fc = 1 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-92 typical		dBc
Second harmonic	HD2	fc = 5 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-65 typical		dBc
Third harmonic	HD3	fc = 5 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-70 typical		dBc
Crosstalk, output to output	CT	f = 5 MHz, G = +2	+25°C	01	-70 typical		dB
Input voltage noise		f = 100 kHz	+25°C	01	8 typical		nV/ √Hz
Input current noise		f = 100 kHz	+25°C	01	600 typical		fA/ √Hz

See footnotes at end of table.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 4

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions V _S = ±5 V, R _L = 2 kΩ, gain = +1 unless otherwise specified	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
DC performance.							
Input offset voltage	V _{IO}		+25°C	01		3	mV
			-55°C to +105°C		0.5 typical	4.5	
Input offset voltage drift	ΔV _{IO}		+25°C	01	4.5 typical		μV/°C
Input bias current	I _{IB}		+25°C	01		750	nA
			-55°C to +105°C		400 typical	2.0	
Input bias current drift	ΔI _{IB}		+25°C	01	3 typical		nA/°C
Input offset current	I _{IO}		+25°C	01	±25 typical		nA
Open loop gain	A _{OL}	V _{OUT} = ±2.5 V	+25°C	01	70 typical		dB
Input characteristics.							
Input resistance	R _{IN}		+25°C	01	10 typical		MΩ
Input capacitance	C _{IN}		+25°C	01	2 typical		pF
Input common mode voltage range	V _{INR}	R _L = 1 kΩ	+25°C	01	±4 typical		V
Common mode rejection ratio	CMRR	V _{CM} = ±2.5 V	+25°C	01	61		dB
			-55°C to +105°C		67 typical	59	
Output characteristics.							
DC output voltage swing		R _L = 2 kΩ, saturated output	+25°C	01	±4 typical		V
Capacitive load drive	C _L	30% overshoot, G = +2	+25°C	01	20 typical		pF

See footnotes at end of table.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 5

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions Vs = ±5 V, RL = 2 kΩ, gain = +1 unless otherwise specified	Temperature, TA	Device type	Limits		Unit	
					Min	Max		
Power supply .								
Operating range			+25°C	01	3	12	V	
Quiescent current per amplifier	IQ		+25°C	01		1.5	mA	
			-55°C to +105°C			1.0 typical		2.6
Power supply rejection ratio	PSRR	Positive supply	+25°C	01	71		dB	
			-55°C to +105°C			77 typical		
					63			
		Negative supply	+25°C		64			
			-55°C to +105°C			70 typical		
					63			

See footnotes at end of table.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 6

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions VS = 5 V, RL = 2 kΩ to VS/2, gain = +1, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Dynamic performance.							
-3 dB bandwidth	BW	G = +1, VOUT = 0.2 Vpp	-55°C to +105°C	01	275		MHz
					300 typical		
		G = +2, VOUT = 0.2 Vpp	+25°C		150 typical		
		G = +1, VOUT = 2 Vpp	+25°C		30 typical		
Bandwidth for 0.1 dB flatness	BW	G = +2, VOUT = 0.2 Vpp	+25°C	01	45 typical		MHz
Slew rate	SR	G = +1, VOUT = 2 V step, RL = 2 kΩ	+25°C	01	340		V/μs
					365 typical		
		-55°C to +105°C	275				
			305 typical				
Overdrive recovery time	IODR	G = +2, 1 V overdrive	+25°C	01	50 typical		ns
Settling time to 0.1%	tS	G = +2, VOUT = 2 V step	+25°C	01	18 typical		ns
Noise/harmonic performance.							
Signal frequency distortion response (SFDR)							
Second harmonic	HD2	f _c = 1 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-82 typical		dBc
Third harmonic	HD3	f _c = 1 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-79 typical		dBc
Second harmonic	HD2	f _c = 5 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-60 typical		dBc
Third harmonic	HD3	f _c = 5 MHz, VOUT = 2 Vpp, RL = 2 kΩ	+25°C	01	-67 typical		dBc
Crosstalk, output to output	CT	f = 5 MHz, G = +2	+25°C	01	-70 typical		dB
Input voltage noise		f = 100 kHz	+25°C	01	8 typical		nV/ √Hz
Input current noise		f = 100 kHz	+25°C	01	600 typical		fA/ √Hz

See footnotes at end of table.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 7

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions Vs = 5 V, RL = 2 kΩ to Vs/2, gain = +1, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
DC performance.							
Input offset voltage	V _{IO}		+25°C	01		3	mV
			-55°C to +105°C			0.8 typical	
Input offset voltage drift	ΔV _{IO}		+25°C	01	3 typical		μV/°C
Input bias current	I _{IB}		+25°C	01		750	nA
			-55°C to +105°C			400 typical	
Input bias current drift	ΔI _{IB}		+25°C	01	3 typical		nA/°C
Input offset current	I _{IO}		+25°C	01	±30 typical		nA
Open loop gain	AOL	V _{OUT} = ±2.5 V	+25°C	01	70 typical		dB
Input characteristics.							
Input resistance	R _{IN}		+25°C	01	10 typical		MΩ
Input capacitance	C _{IN}		+25°C	01	2 typical		pF
Input common mode voltage range	V _{INR}	RL = 1 kΩ	+25°C	01	1.0 to 4.0 typical		V
Common mode rejection ratio	CMRR	V _{CM} = ±1 V	+25°C	01	59		dB
			-55°C to +105°C			65 typical	
Output characteristics.							
DC output voltage swing		RL = 2 kΩ, saturated output	+25°C	01	0.9 to 4.1 typical		V
Capacitive load drive	C _L	30% overshoot, G = +2	+25°C	01	20 typical		pF

See footnotes at end of table.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 8

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions Vs = 5 V, RL = 2 kΩ to Vs/2, gain = +1, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Power supply.							
Operating range			+25°C	01	3	12	V
Quiescent current per amplifier	IQ		+25°C	01		1.5	mA
					0.9 typical		
Power supply rejection ratio	PSRR		-55°C to +105°C	01	65		dB
					71 typical		

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 9

Case X

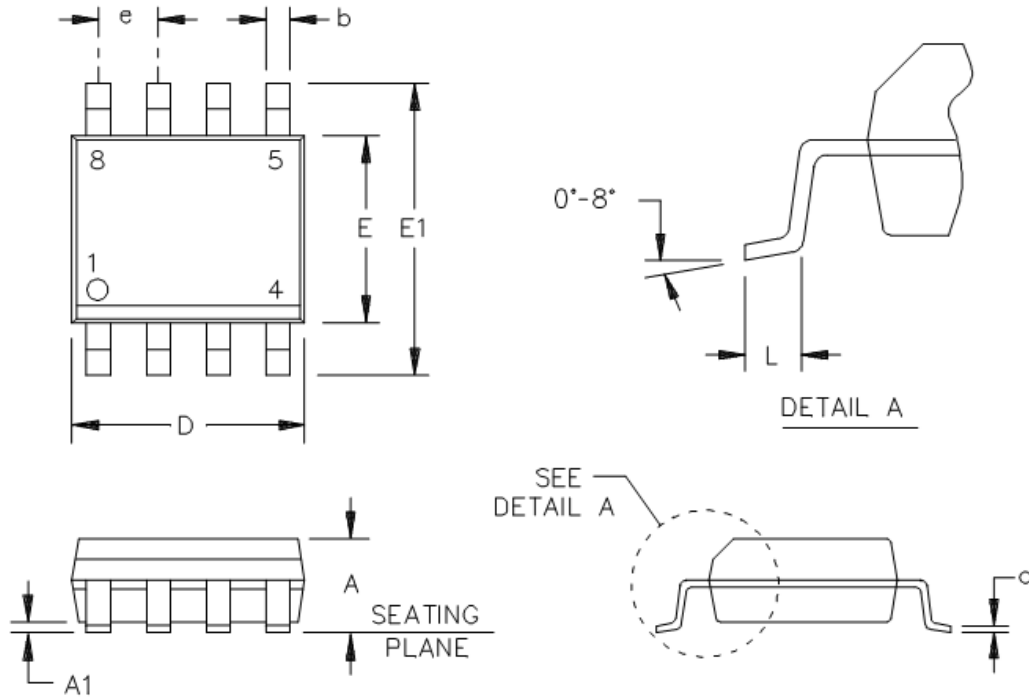


FIGURE 1. Case outline.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 10

Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.053	.068	1.35	1.75
A1	.004	.010	0.10	0.25
b	.012	.020	0.31	0.51
c	.006	.009	0.17	0.25
D	.188	.196	4.80	5.00
E	.149	.157	3.80	4.00
E1	.228	.244	5.80	6.20
e	.050 BSC		1.27 BSC	
L	.015	.049	0.40	1.27

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Falls within reference to JEDEC MS-012-AA.

FIGURE 1. Case outline - Continued.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 11

Device type	01
Case outline	X
Terminal number	Terminal symbol
1	VOUT1
2	-INPUT1
3	+INPUT1
4	-VS
5	+INPUT2
6	-INPUT2
7	VOUT2
8	+VS

FIGURE 2. Terminal connections.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 12

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer’s standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer’s data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/programs/smcr/>.

Vendor item drawing administrative control number <u>1/</u>	Device manufacturer CAGE code	Vendor part number
V62/12644-01XE	24355	AD8039SRZ-EPR7

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code

24355

Source of supply

Analog Devices
 Route 1 Industrial Park
 P.O. Box 9106
 Norwood, MA 02062
 Point of contact: 20 Alpha Road
 Chelmsford, MA 01824-4123

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/12644
		REV B	PAGE 13